REMARKS

Claims 17, 18, 21-23, 28-31, 34-42, and 46 to 52 as set forth in the Listing of the Claims presented on April 25, 2011, are currently pending. No Claim(s) is(are) canceled, amended, or added herewith. Of the pending claims, Claims 17, 18, 22, 23, 31, 34, 38-42, 46, 49 and 52 stand withdrawn from consideration, and Claims 21, 28-30, 35 to 37, 47, 48, 50 and 51 stand rejected.

More specifically, Claims 21, 28-30, 35-37, 47, 48, 50 and 51 were rejected as allegedly being unpatentable

a) under 35 U.S.C. §103(a) in light of the teaching of ***von Deyn et al***. (**WO 96/26206** *which corresponds to* **US 5,846,907**) when taken in view of the disclosure of ***Silverman*** (**The Org. Chem.** *of Drug Design and Drug Action, Academic Press, Inc. San Diego, 1992, pp. 4-51*), and

b) under the judicially created doctrine of obviousness-type patenting in light of Claims 1 to 8 of ***von Deyn et al***. (**id.**) when taken in view of the disclosure of ***Silverman*** (**id.**).

For the reasons more specifically addressed in the following, the arguments in support or the rejection are not applicable to the claims in the version presented herewith, and/or the arguments are insufficient to support a conclusion of obviousness.

"Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

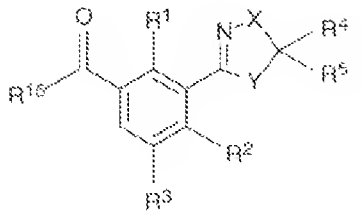
In determining the scope and content of the prior art, the references have to be considered as a whole, have to be viewed from the vantage point of one having ordinary skill at the pertinent time, and have to be considered without the benefit of impermissible hindsight vision afforded by the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

Further, the fact that a claimed species or subgenus is encompassed by a prior art genus is not sufficient by itself to establish a *prima facie* case of obviousness. *In re Baird*, 16 F.3d 380, 382 (Fed. Cir. 1994). In fact, the Federal Circuit specifically "*decline[d] to extract from Merck [& Co. v. Biocraft Laboratories Inc., 874 F.2d 804 (Fed. Cir. 1989)] the rule that . . . regardless of how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it.*" *See In re Jones*, 958 F.2d 347, 350 (Fed. Cir. 1992); *In re Deuel*, 51 F.3d 1552, 1559 (Fed. Cir. 1995). In order to find a *prima facie* case of unpatentability in instances involving structurally similar compounds, it is also required that the prior art would have suggested making the specific molecular modifications which are necessary to arrive at the claimed invention. The Court noted in this context in particular that the respective test for *prima facie* obviousness for chemical compounds was consistent with the legal principles enunciated by the Supreme Court in *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007). *See Takeda Chemical Industries, Ltd. v. Alphapharm PTY., Ltd.*, 492 F.3d 1350, 1356 (Fed. Cir. 2007).

The claimed invention, or the subject matter of a claim, is not merely the combination of elements which are recited in the claim but also includes the properties and results of the particular combination of elements. *In re Antonie*, 559 F.2d 618, 619 (CCPA 1997). While the mere "*combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results[,]*" the fact that combined prior art elements "*work[] together in an unexpected and fruitful manner support[s] the conclusion*" that a claimed subject matter is non-obvious. *KSR*, 127 S. Ct. at 1740.

The analysis employed in an obviousness-type double patenting rejection parallels the guidelines for analysis of a 35 U.S.C. §103 obviousness determination. *E.g.*, *In re Braithwaite*, 379 F.2d 594 (CCPA 1967); *In re Longi*, 759 F.2d 887 (Fed. Cir. 1985); *In re Braat*, 837 F.2d 589 (Fed. Cir. 1991). Accordingly, the following remarks are equally applicable to both of the rejections.

The subject matter of Claim 28 is deemed to be representative of the subject matter delineated in Claims 21, 28 to 30, 35 to 37, 47, 48, 50 and 51. Claim 28 is drawn to a particular 3-heterocyclyl-substituted benzoyl compound of formula I



wherein

X is O;

R^1 is C_1-C_2-alkyl, methoxy or methylsulfonyl;

R^2 is nitro, halogen, C_1-C_6-alkyl, C_1-C_6-haloalkyl, C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl or C_1-C_6-haloalkylsulfonyl;

R^3 is hydrogen, halogen or C_1-C_6-alkyl;

R^4 is hydrogen or methyl, and R^5 is hydrogen;

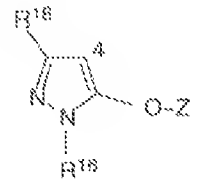
Y is $CR^{13}R^{14}$;

R^{13}, R^{14} are hydrogen, C_1-C_4-alkyl, C_1-C_4-haloalkyl, C_1-C_4-alkoxycarbonyl, C_1-C_4-haloalkoxycarbonyl or $CONR^7R^8$;

R^7 is hydrogen or C_1-C_4-alkyl;

R^8 is C_1-C_4-alkyl;

R^{15} is a pyrazole of formula II which is linked in the 4-position



wherein

R^{16} is C_1-C_6-alkyl;

Z is H; and

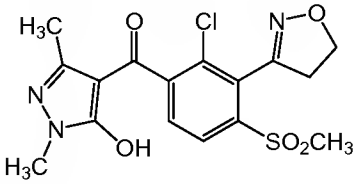
R^{18} is hydrogen or methyl.

Claims 29, 30, 31, 34 to 37, and 50 are drawn to embodiments of the compounds which fall within the scope of Claim 28. Claim 21 is drawn to a composition comprising at least one compound according to Claim 28, and Claims 48 and 51 are drawn to embodiments of the composition which fall within the realm of Claim 21.

The rejection applies the teaching of ***von Deyn et al***. for generically embracing compounds of applicants' formula (I) and compositions comprising those compounds, and specifically for illustrating in Examples 5.4 and 5.5 compounds which differ from those of applicants' claims in that they carry a chlorine substituent in the position designated as R^1 in applicants' formula (I). That is, the respective illustrative compounds of ***von Deyn et al***. are substituted by chlorine in a position where applicants' compounds carry a C_1-C_2-alkyl group, a methoxy group, or a methylsulfonyl group. In this regard, the rejection specifically refers to Claim 4 of ***von Deyn et al***. which is drawn to the compounds of ***von Deyn et al***.'s generic formula and wherein the group corresponding to applicants' group R^1 (group M of prior art formula (I)) is methyl, methoxy, methylthio, chlorine, cyano, methylsulfonyl, nitro or trifluoromethyl. Additionally, the rejection refers to the disclosure of ***Silverman*** as describing methyl and chlorine as bioisosteres which would be expected to maintain activity. On this basis, the rejection concludes that it would have been *prima facie* obvious to one having ordinary skill to modify the illustrative compounds in Examples 5.4 and 5.5 of ***von Deyn et al***. by replacing the chlorine substituent of the prior art compounds by a methyl group with the expectation that the resultant compounds and ***von Deyn et al***.'s compounds exhibit the same activity.

The teaching of ***von Deyn et al***., taken alone or taken in view of the disclosure of ***Silverman***, is insufficient to suggest that making the specific structural modification which is necessary to arrive at applicants' compounds would yield compounds exhibiting higher activity against unwanted plants while, at the same time, being less harmful to crop plants. The particular and surprising properties of applicants' compounds are shown by comparative investigations addressed, inter alia, in Dr. Witschel's Declaration of December 14, 2011. Table 1B on page 3 of the Declaration sets forth the results of investigations into the effectivity of the prior art compound 5.4 and a corresponding compound according to applicants' claims, designated as A. Correspondingly, Table 1C on page 4 of the Declaration sets forth the results of investigations into the effectivity of the prior art compound 5.5 and a corresponding compound according to applicants' claims, designated as B. For convenience, the structures of the respective compounds, as well as the property data included in Dr. Witschel's Declaration, are reproduced below:

Prior Art Compound 5.4:



Applicants' Compound A:

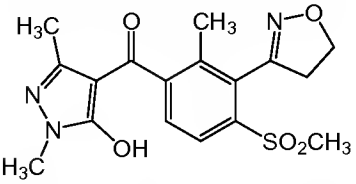
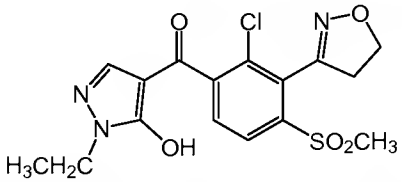


Table 1B (*the data and results are set forth in Table 3 on page 3 of Declaration 1*) Comparison of the efficacy (*plant damage in percent*) of prior art compound 5.4 and comparative compound **A** as disclosed and claimed in application Ser. No. 09/091,300:

Application Rate	62.5 g/ha		31.2 g/ha	
Compound	**A**	5.4	**A**	5.4
Abutilon theoprasti	**90**	85	**85**	65
Brachiaria platyphylla	**90**	80	**80**	65
Polygonum persicaria	**98**	75	**70**	65
Sinapis alba	**100**	90	**100**	85
Stellaria media	**100**	90	**100**	85

Prior Art Compound 5.5:



Applicants' Compound B:

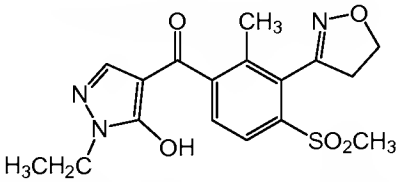


Table 1C (*the data and results are set forth in Table 2 on page 3 of Declaration 1*) Comparison of the efficacy (*plant damage in percent*) of prior art compound 5.5 and comparative compound **3.90** as disclosed and claimed in application Ser. No. 09/091,300:

Application Rate	62.5 g/ha		31.2 g/ha	
Compound	**3.90**	5.5	**3.90**	5.5
Crop Plant: Zea mays	**10**	20	**0**	0
Unwanted Plants: Abutilon theoprasti	**80**	75	**80**	60
Amaranthus retroflexus	**80**	70	**80**	60
Digitaria sanguinalis	**100**	100	**100**	98
Setaria italica	**95**	90	**90**	85

Dr. Witschel comments on the results of the comparisons, stating: "The data compiled in each of the … tables show that the chlorine-substituted prior art compound was, in all instances, less effective against the unwanted plants than the corresponding methyl-substituted compound. In fact, the effectivity of the chlorine-substituted prior art compound against the unwanted plants when used at the higher application rate was, in all but one test, equal or even below that of the corresponding methyl-substituted compound according to the present application when applies [sic] at half the application rate. This finding in and of itself is surprising when the teaching of ***von Deyn et al***. and the disclosure of ***Silverman*** are considered." *Declaration*, page 4, 1st para.

The teaching of ***von Deyn et al***., when taken alone at best merely suggests that it is of no consequence with regard to the properties of the compounds whether the group M of the prior art formula represents methyl, methoxy, methylthio, chlorine, cyano, methylsulfonyl, nitro or trifluoromethyl, as provided in Claim 4 of the reference. Accordingly, ***von Deyn et al***.'s teaching would not have suggested making the specific molecular modifications which are necessary to arrive at the claimed invention. *Takeda*, 492 F.3d at 1356.

Rather than suggesting that a particular structural modification has a beneficial impact on the properties of an active compound in general, the disclosure of ***Silverman***, in fact, suggests that the effect of a structural modification on the properties of an active compound cannot be predicted. ***Silverman*** explains that exchanging a group in an active compound by a classical or non-classical bioisostere may be useful to attenuate toxicity or to modify the activity of the compound. ***Silverman***, page 19, "Bioisosterism" ll. 1-5. In this context it is important to note that ***Silverman*** makes a distinction between the terms 'activity' and 'potency.' As used by ***Silverman***, 'activity' is the particular biological or pharmacological effect (e.g., antibacterial activity or anticonvulsant activity) whereas 'potency' is the strength of the effect. ***Silverman***, page 8, ll. 7-10. Accordingly, ***Silverman***'s explanations on page 19 indicate that replacing a group in a compound by a bioisosteric group may alter the potency of the compound, or may change the biological or pharmacological effect of the compound. More specifically, ***Silverman*** addresses that a bioisosteric replacement affects size, shape, electronic distribution, lipid and water solubility, pK_a, chemical reactivity, and hydrogen bonding, and thus, impacts factors such as receptor interaction, pharmacokinetics, and metabolism. ***Silverman***, page 21, ll. 12-31. In this context, it is explained that bioisosteric replacement "allows the medical chemist to tinker with

only some of the parameters in order to augment the potency, selectivity, and duration of action, and to reduce toxicity. Multiple alterations may be necessary to counterbalance effects. ..." ***Silverman***, page 21, ll. 32-36, *emphasis added*. Applicants respectfully urge that 'tinkering with some parameters' clearly indicates a lack of certainty or direction as to which of the parameters may be result effective and also which type of bioisosteric replacement may be successful to achieve a desired result. However, a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d at 620. The teaching of ***von Deyn et al***. clearly fails to provide any information as to which of the variable groups of prior art formula (I) is a result-effective parameter, i.e., which of the multiple variable groups of the prior art formula (I) achieves a desirable impact on the potency or selectivity of the prior art herbicide. Accordingly, given the teaching of ***von Deyn et al***., taken in view of the disclosure of ***Silverman***, one having ordinary skill has to 'tinker' with all of the variable groups of ***von Deyn et al***.'s compounds with the option to employ any one of the possible bioisosteric replacements delineated in ***Silverman***'s Tables 2.2 and 2.3. As such, the teaching of ***von Deyn et al***. and the disclosure of ***Silverman***, at best, merely render applicants' invention 'obvious to try.'

However, when what would have been 'obvious to try' would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful, an invention would not have been obvious. *In re O'Farrell,* 853 F.2d 894, 903 (Fed. Cir. 1988). This is another way to express the *KSR* prong requiring the field of search to be among a 'finite number of identified' solutions. *KSR,* 127 S.Ct. at 1742; *see also Proctor & Gamble,* 566 F.3d 566, 996 (Fed. Cir. 2009); *In re Kubin,* 561 F.3d 1351, 1359 (Fed. Cir. 2009).

The rejection asserts that applicants have failed to provide a direct comparison with the closest prior art. Office action page 6, ll. 17-18. However, as the data reproduced in the foregoing show, applicants have provided the necessary direct comparison. The rejection also asserts that the differences in potency and selectivity of the compounds which are evidenced by applicants' data 'are merely differences in degree that one of ordinary skill in the art would

expect.' Office action page 7, ll. 1-4. Applicants respectfully disagree that one having ordinary skill in the art could reasonably expect any particular differences. Especially ***Silverman***'s disclosure makes clear that it requires 'tinkering' to arrive at a useful result. Moreover, as evidenced by the disclosure of ***Change*** **(US 4,405,357)** replacing a chlorine group in a herbicidal compound by a methyl group may dramatically reduce the potency of the compound. Dr. Witschel's Declaration, page 5, 2nd para. to page 6, line 6. In the basis of the teaching of ***von Deyn et al***. and the disclosure of ***Silverman***, one having ordinary skill in the art, therefore, has not reasonable expectation that replacing the chlorine group of prior art compounds 5.4 and 5.5 by a methyl group would yield compounds having improved potency against unwanted plants while, at the same time, being better tolerated by crop plants.

Especially the improvement which is achieved due to the fact that applicants' compounds are better tolerated by crop plants while being more potent against unwanted plants clearly shows that the change in properties is not merely a matter of degree rather than a difference in kind. In any event, the determination of obviousness does not hinge on the question whether the properties claimed compounds differ from those of prior art in in kind rather than in degree. As was stated by the Court in *In re Wagner,* 371 F.2d 877, 885 (CCPA 1967):

> *We find nothing in section 103 which warrants the board's attempted dismissal of the differences between appellants' claimed compound and the prior art as not being "differences in kind," whatever this may mean. This phrase as here encountered is used by the board to infer that unless a "difference in kind" is found, the invention is obvious under section 103. Whether the difference between the claimed invention and the prior art is a difference "in kind" or a difference "in degree" is not mentioned in section 103. Section 103 simply requires a determination as to whether the invention as a whole would have been obvious to one of ordinary skill in the art at the time of appellants' invention. An unexpected increase in physiological activity may be persuasive evidence of unobviousness. In all cases it is to be considered along with other evidence of unobviousness.*

(*Citation omitted; emphasis added*). Similarly, the Court stated in *In re Lunsford,* 357 F.2d 380, 384 (CCPA 1966):

> *[W]e find no authority in section 103 for treating "improvement" inventions, or inventions differing from the prior art only "in matter of degree," any differently from other types of inventions ... . [W]e are inclined to agree with appellant that inventions of the type here involved*

> *are frequently made only after the expenditure of vast amounts of research time and effort; in short, they represent the very kind of invention some industries, most notably the drug industry, seek in order to obtain, or maintain, the kind of competitive advantage which promotes progress in the "useful arts."*
> * * * * * *
> *Furthermore, like the Patent Office, we have frequently found novel chemical processes producing the same product, but in unexpectedly higher yields, to be patentable by reason of that yield, a "matter of degree." Should not chemical products, also displaying an unexpectedly higher degree of effectiveness, be treated in like manner?*

At least for the foregoing reasons, the subject matter of applicants' Claims 21, 28-30, 35-37, 47, 48, 50 and 51 is not rendered unpatentable under 35 U.S.C. §103 or under the doctrine of obviousness-type double patenting by the teaching of ***von Deyn et al.***, or Claims 1-8 of the reference, when taken in view of the disclosure of ***Silverman***. It is therefore respectfully requested that the respective rejection be withdrawn. Favorable action is solicited.

CONCLUSION

The foregoing shows that the subject matter of applicants' claims is patentable under the pertinent provisions of the statute, and that the claims are in good condition for allowance. In order to facilitate the resolution of any remaining issues or questions presented by this paper, applicants respectfully request that the Examiner directly contact the undersigned by phone to further the discussion. Favorable action is solicited

Respectfully submitted,

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